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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/824,887 | 04/02/2001 | Brandon L. Fliflet | 42390P10580 | 2061 |

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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD, SEVENTH FLOOR
LOS ANGELES, CA 90025

EXAMINER

YANG, RYAN R

ART UNIT PAPER NUMBER

2672

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/824,887

Applicant(s)

FLIFLET, BRANDON L.

Examiner

Ryan R Yang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Claims 1-18 are pending in this application. Claims 1 and 10 are independent claims.
2. The present title of the invention is "Method and apparatus for dynamically balancing graphics workloads on a demand-based zone renderer".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arenburg et al. (6,191,800).

As per claim 1, Arenburg et al., hereinafter Arenburg, discloses a method for balancing workloads of graphics related software and hardware associated with a zone renderer rendering at least one object comprising:

configuring the zone renderer to a predetermined size (Figure 3A);

monitoring hardware or software for a predetermined time period (Figure 4 72

"Each tile is updated one frame, and the various times that it takes for each tile to be rendered are measured", column 6, line 65-67);

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determining whether there is an imbalance between the hardware and software (Figure 4 74 where calculating new tile sizes is determining the imbalance) ; and adjusting the size of the zone renderer to minimize the imbalance (Figure 4 78 Adjust Tile Geometries).

It is noted that Arenburg does not explicitly disclose a software renderer and a hardware renderer, however, software renderer and hardware renderer are considered functionally equivalent and are mutually exchangeable.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate software and hardware in order to make the zone renderer more versatile in rendering the image.

5. As per claim 2, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses configuring the zone renderer to a predetermined size comprises:

configuring the zone renderer to approximate a size of a cache associated with the hardware ("an approximate solution may be employed by first using Eq. 5 to obtain the initial unconstrained solution. If a tile is found with an area less than A-Minimum, then this tile area is set to A-Minimum", column 6, line 22-25).

6. As per claim 3, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses monitoring hardware or software for predetermined period comprises:

polling the hardware for a predetermined number of cycles ("Each tile is updated one frame, and the various times that it takes for each tile to be rendered are measured", column 6, line 65-67, where one frame is a plurality of cycles.

7. As per claim 4, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses monitoring hardware or software for predetermined period comprises:

determining an execution time for software associated with rendering at least one object in relation to total processing time ($t(i)$ of Eq. 3 is rendering time for one object and the total processing time is $t(1)+\dots +t(n)$).

8. As per claim 5, Arenburg demonstrated all the elements as applied to the rejection of dependent claim 3, supra, and further discloses monitoring hardware or software for predetermined period comprises:

determining an execution time for software associated with rendering at least one object in relation to total processing time ($t(i)$ of Eq. 3 is rendering time for one object and the total processing time is $t(1)+\dots +t(n)$).

9. As per claim 6, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses adjusting the size of the zone renderer to minimize the imbalance comprises:

increasing the size of the zone renderer when there is an imbalance associated with the software (By multiplying each tile with a weighting factor, see column 6, line 30-51).

10. As per claim 7, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses adjusting the size of the zone renderer to minimize the imbalance comprises:

decreasing the size of the zone renderer when there is an imbalance associated with the hardware (By multiplying each tile with a weighting factor, see column 6, line 30-51).

11. As per claim 8, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses the maximum zone size is equal or approximately equal to a display which receives rendered objects (the maximum weighting factor is 1 which is the size of the display , Eq. 8).

12. As per claim 9, Arenburg demonstrated all the elements as applied to the rejection of independent claim 1, supra, and further discloses the minimum zone size is equal or approximately equal to the size of a cache associated with the hardware ("an approximate solution may be employed by first using Eq. 5 to obtain the initial unconstrained solution. If a tile is found with an area less than A-Minimum, then this tile area is set to A-Minimum", column 6, line 22-25).

13. As per claims 10-18, since Arenburg's system is a computer with processor (Figure 1 12) to carry out program instructions, his method can certainly be carried out by the program instructions and therefore are similarly rejected as claims 1-9, respectively.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Inquiries

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Ryan Yang** whose telephone number is **(703) 308-6133**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Michael Razavi**, can be reached at **(703) 305-4713**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

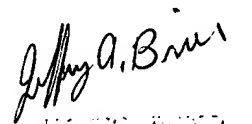
Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Ryan Yang
March 9, 2003


JEFFERY BRIER
PRIMARY EXAMINER